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ABSTRACT

Teachers can help students develop effective content reading/study skills by manipulating the presentation of reading materials in such a way that students can see and internalize model behaviors associated with those skills. For example, teachers can augment paragraphs of content materials with short exercises in using context clues to infer the definition of a word. Another activity is the graphic organizer or structured overview, in which the teacher introduces material by highlighting ideas or concepts and representing their interrelationships much like blueprints that students can later use to construct meaning from the text. Other techniques can be used to improve student reading comprehension and understanding of content structure. One of these techniques offers visual displays of relationships that have been developed, followed by multiple choice selections of the inferences resulting from the display. In another method, teachers provide written comments about ideas developed in the text right after those ideas appear in the text; later they gradually "wean" students from this study aid, providing fewer comments and helping students to internalize the process. (RL)

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Organizing Behaviors That Facilitate Comprehension in Content Materials

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ORGANIZING BEHAVIORS THAT FACILITATE COMPREHENSION
IN CONTENT MATERIAL

An analysis of schooling as it is presently constituted indicates clearly that a critical dimension of reading instruction relates to the larger issue of the acquisition of academic content in areas such as the social sciences, the language arts, the natural and applied sciences, mathematics, and technical/vocational education. This paper will present a process of reading/content integration in which reading instruction occurs within the framework of the content curriculum and is shaped to promote the acquisition of the concepts which comprise the subject matter.

Vocabulary and Concept Development

Studies (Davis, 1968, 1972; Spearitt, 1972; Thorndike, 1973 - 1974) designed to specify factors underlying reading comprehension have identified consistently a component called "word meaning" or "word knowledge." This factor acquires additional significance in the process of content acquisition because knowledge of technical terminology is essential as a basis for understanding important concepts.

The words of particular interest in content area reading are those which represent abstract concepts involving relations. These "relational concepts" include such things as "physical concepts like mass and temperature, language concepts like subject and object, mathematical concepts like square root and prime number." (Gagne, 1970, p. 172)

Thus, a critical dimension of vocabulary instruction in content areas concerns the extent to which students are able to learn technical terms as

a basis for understanding their underlying concepts. Because most technical vocabulary is not found in the speaking, listening, or reading vocabularies of learners, it is important that such terms be presented in ways which maximize the possibility of their acquisition.

Two techniques which have proven useful in teaching technical terminology are modeling word meaning behaviors and the structured overview. Modeling provides students with a process for applying techniques designed to elicit meaning from unknown words encountered in reading. To illustrate the techniques which might be modeled for students, consider this sample sentence:

> As the archaeologist dug deeper into the subsoil, he located more artifacts, including pieces of broken pottery and simple stone tools.

To gain meaning from the sentence, it is important for students to be able to apply word meaning behaviors such as contextual analysis, use of the dictionary as a source of word meaning, and structural analysis. In this sentence it is quite possible that the word "archaeologist" will require use of the dictionary, although the tenor of the entire sentence provides some general contextual clues, as might a knowledge of the structural components archaeo- and -logy. "Subsoil" may be defined from the context of "dug deeper" and/or from a knowledge of the structural elements sub- and soil. A series of contextual examples (pieces of broken pottery, simple stone tools) provide meaning for the term "artifacts."

The role of the teacher is to model the application of such word meaning skills through examples selected from the content.

Here is an example of a teacher using an excerpt from Robinson

Crusoe, an assigned reading, to model the technique of contextual analysis:

PART I Look at the words below. Put an x in front of those that are familiar. Then, for each word, underline a definition. Do this even if you don't know the word and have to guess.

____adversary-friend; opponent; wild animal; adviser

____mendicants-mechanics; citizens; medicine men; beggars

____gaskin-hind leg; gaslight; rope; stopper

PART II Read the following paragraphs in which the words above are used. When you finish, go back to PART I and change any answers you wish.

Instantly the figure reappeared, and, making a wide circuit,began to head me off. I could see that it was useless for me to try to try to outdistance such an adversary. I stood still, therefore, and cast about for some method of escape; and as I was so thinking, the recollection of my pistol flashed into my mind...

Of all the mendicants that I had seen or fancied, he was the chief for raggedness. The patchwork of his tattered clothing was held together by the most various and singular fastenings: brass buctons, bits of stick, and loops of tarry gaskin...

PART III Here are the correct answers (give to students). Often you can figure out a meaning of an unfamiliar word from the other words used with it. Getting meaning from an unknown word's surroundings is called using context. Let us discuss how you arrived at the meanings of the words in PART I.

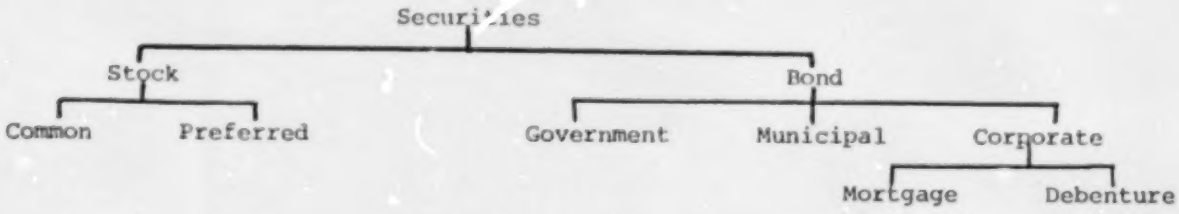
This discussion or verbalization of the process is critical if students are to understand the use of context. For example, the definition of "adversary" is arrived at cumulatively by putting together bits of information such as "began to head me off," "some method of escape," and finally the information in the second paragraph that this "adversary" wears clothing. Together, they lead the reader to an inference that "adversary" means an opponent, a threat. In this case the adversary is a person. This thinking process should be articulated for the students.

Similar modeling should be provided for illustrating the insertion of the different meanings contained in a dictionary entry for an unknown word until the meaning that is consistent with the context is found and for using the structural elements of words (roots, combining forms, affixes) to determine meaning. The basic determinant for teaching such behaviors is their usefulness in helping readers deal with unknown vocabulary in a specific reading assignment.

It is important that the content teacher take advantage of every opportunity to help students internalize the meanings of words that convey essential concepts. Understanding the meanings of such terms is a critical first step in the process of comprehending content materials.

Another activity which provides both direct instructional exposure to technical vocabulary and models the "structure of content" is the graphic organizer or structured overview. Barron (1969) describes the underlying philosophy of the structured overview in this way: "... the vocabulary of content subjects can be introduced in such a way that the words assume the form of 'advance organizers' and provide the students with cues to the 'structure' of subjects." (p. 29) In effect, the key vocabulary terms representing the important concepts contained in the

content are identified, organized in a graphic display which presents relationships among the terms in a hierarchical fashion, and presented to the students prior to their reading of a chapter or unit of material. The graphic display typically uses vertical and horizontal dimensions to portray ideas of differing and/or similar levels of abstraction. Here, for example, is a structured overview of a section from an economics textbook dealing with securities.



(developed by Richard Kerper)

Students are introduced to the overview by the teacher, who discusses the ideas or concepts represented by the terms and their relationships. The overview serves as a kind of cognitive blueprint or framework which students will be able to use to guide their reading.

Reading For Meaning

A critical dimension in the acquisition of content is the ability of the learner to apply comprehension strategies that will permit him/her to acquire meaning from what is read. Selected for illustration here are techniques for modeling the processes of drawing inferences and responding critically.

The process of inference in content materials may be defined as the reader's ability to relate discrete pieces of information in order to arrive at an idea which is not explicitly presented. Deriving inferences is a behavior pertinent to an understanding of literature, the social

sciences, and the natural and applied sciences. A basic social studies selection will be used to exemplify a modeling of the inferential process for students.

> In most parts of the world, early man used stone for his tools. In some places he found other suitable materials; he could use ivory where there were animals with tusks, and shells if he lived near the sea.

Figure 1 is designed to portray for students the derivation of an inference. The shaded area of intersection represents an idea whose source lies in the reader's ability to relate the information given.

Insert Figure 1 about here

After viewing the model, the student might be asked to select an appropriate inference from several possible choices, such as

____the absence of tools hindered the development of early man.

____early man used his environment to supply his needs.

____stone was the only material used by early man to make tools.

or, at a more advanced level, to generate an inference. The goal of this process is to provide the student with a visual model which can be internalized and applied independently to the reading of content materials.

Carney (1973) has developed a strategy designed to activate meaningful models of desirable responses to what has been read at significant points within the material. These models, called embedded organizers, act as

stimuli for arousing the readers' interest and focusing their attention upon the critical dimensions of the content to be learned. In order to assist readers to formulate their thinking, they are directed to respond in writing to the content and the model in a blank following the embedded organizer.

The following is an excerpt from the selection "Pressures for Independence" in Colonial Kenya: Cultures in Conflict, which has been modified to include embedded organizers.

> THE SETTLERS, through their Kenya Electors Union, countered with a demand for the deportation of Kenyatta. They blamed him for instituting strikes and inciting rebellion. British colonial officials responded instead with attempts to meet some of the African demands. (*Finally! This suggests a real change in attitude on the part of the colonial officials.*) (
>
>)
>
> Months, then years, were devoted to debate and bargaining over proposed constitutional changes. But when they were announced early in 1952 they added up only to changes in the Legislative Council:
>
> 30,000 Europeans were to have 14 elected members;
>
> 90,000 Indians were to have 6 elected members;
>
> 24,000 Arabs were to have 1 elected member;
>
> 5,000,000 Africans were to have 5 appointed members.

(Not so much of a change after all--almost no action taken. Note carefully numbers of representatives for each group and how Africans' representatives are selected.)

(

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This procedure is designed specifically to simulate the interactive process between the mature, questioning reader and the material being read. Over time, the written response format and, ultimately, the embedded organizers themselves are phased out as readers begin to internalize the process.

Recognizing The Structure of Content

The nature of academic disciplines is such that the written presentation of ideas tends to take certain forms and follow certain patterns. Expository materials develop concepts through patterns such as cause-effect, comparison of ideas, superordinate and subordinate ideas, and sequence (both logical and chronological). Various literary forms such as poetry, drama, and the novel are characterized by specific forms and patterns.

Assisting readers to perceive the underlying structure of content facilitates the acquisition of ideas presented. For example, the analysis of the following piece of material suggests that a knowledge of comparison is pertinent to an understanding of the content.

> Both birds and fish belong to the group called vertebrates, animals with backbones. However, birds are warmblooded and breathe with lungs, while fish are coldblooded and breathe with gills.

One method of assisting readers to see such patterns is through a

visual representation of the structure of the content. Figure 2 illustrates the paragraph presented above.

Insert Figure 2 about here

Time lines designed to illustrate a chronological sequence of events are another example of visually presenting the structure of content. In his book, The Dragons of Eden, Carl Sagan presents the fifteen billion year lifetime of the universe through the use of a calendar format representing the span of a single year. For example, the "Big Bang" occurs on January 1, formation of the earth on September 14, and the first humans at approximately 10:30 p.m. of December 31. (pp. 14 - 16)

Strategies such as those presented above make it possible for readers to examine the development of ideas and their relationships to each other. The awareness of structure, then, begets meaning.

SUMMARY

This paper has presented a series of strategies designed to enhance the acquisition of content from academic materials. Examples of the integration of reading behaviors and academic content in the areas of vocabulary acquisition and concept development, inferential and critical reading, and recognizing the structure of content were considered. It has been a basic premise of the paper that the adoption of the strategies outlined will result in the enhancement of students' thinking through reading.

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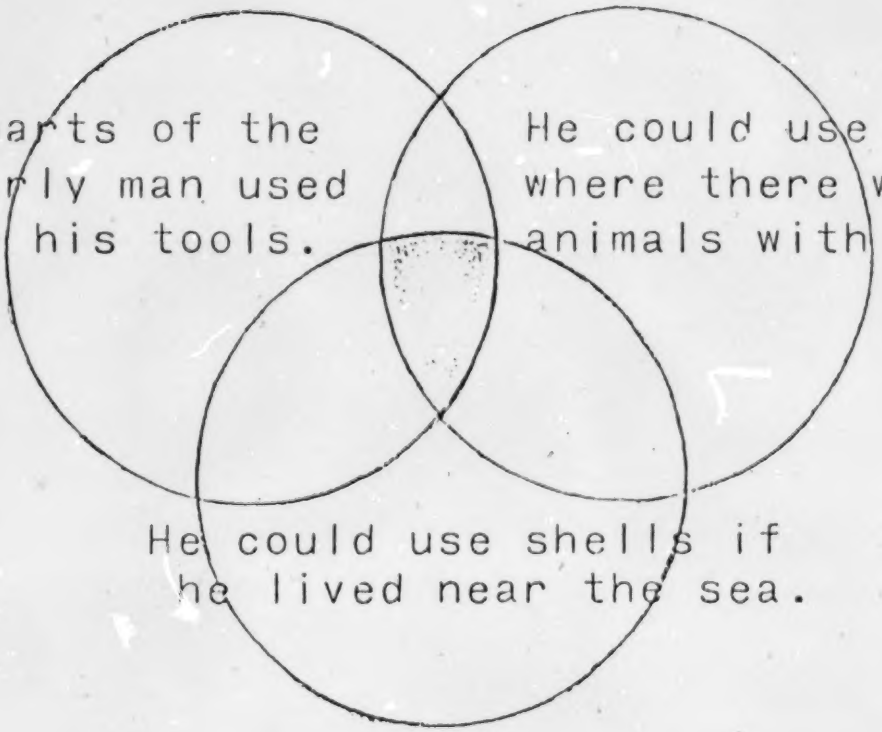
Figure Captions

Figure 1. Model of inferential comprehension.

Figure 2. Organizational pattern: comparison.


In most parts of the world, early man used stone for his tools.
He could use ivory where there were animals with tusks.
He could use shells if he lived near the sea.

	BIRDS	FISH
ALIKE	backbone	backbone
DIFFERENT	breathe with lungs	breathe with gills
DIFFERENT	warmblooded	coldblooded